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10/591,749

09/06/2006

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EXAMINER

JACKSON, MONIQUE R

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

05/08/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                       |   |  |
|------------------------------|---------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/591,749  | <b>Applicant(s)</b><br>HASHIMOTO ET AL. |  |
|                              | <b>Examiner</b><br>Monique R. Jackson | <b>Art Unit</b><br>1794                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-7,9-15,17-19,21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-7,9-15,17-19,21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. The amendment filed 1/15/09 has been entered. Claims 4, 8, 16 and 20 have been canceled. Claims 1-3, 5-7, 9-15, 17-19, and 21-22 are pending in the application. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. In view of Applicant's amendments filed 1/15/09, the rejections under 35 U.S.C. 112 as recited in paragraphs 2-5 of the prior office action have been withdrawn.

#### ***Claim Rejections - 35 USC § 112***

3. Claims 1-3, 5-7, 9, 12-15, 17-19, and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation "amorphous polyimide (B) obtained from at least one aromatic tetracarboxylic dianhydride selected from the group consisting of 2,3,3',4'-biphenyl tetracarboxylic dianhydride, 2,2',3,3'-biphenyl tetracarboxylic dianhydride, and an aromatic diamine" however it appears from this limitation that the aromatic diamine is part of the Markush group for the aromatic tetracarboxylic dianhydrides. It is suggested that the term "and" be inserted between the two biphenyl tetracarboxylic dianhydrides and a semicolon be inserted before the term "and an aromatic diamine", or similar modification to clearly specify that the aromatic diamine is not part of the previous Markus' group.

#### ***Claim Rejections - 35 USC § 102***

4. Claims 10, 11 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Okamura et al for the reasons recited in the prior office action and restated below.

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5. Okamura et al teach a laminate useful for flexible printed circuits comprising an insulating polyimide resin layer on a metal foil, preferably copper foil, wherein the insulating resin layer is composed of a plurality of polyimide resin layers on the metal foil and the insulating resin layer has at least one polyimide resin layer (A) with a coefficient of linear expansion (CTE) of  $30 \times 10^{-6} / ^\circ\text{C}$  or less, and at least one polyimide resin layer (B) with a glass transition temperature ( $T_g$ ) of  $300^\circ\text{C}$  or below and in contact with the metal foil (Abstract, Col. 3, lines 36-57.) Okamura et al teach various structures comprising multiple metal foils, multiple A layers and multiple B layers, as shown in Col. 3, lines 1-5, which read upon the claimed structure; wherein the laminates can be formed by successive coating of a solution of the polyimide resin A or B or precursors thereof to the metal foil, a polyimide substrate formed therefrom, or a previously applied layer of either A or B, followed by drying and/or laminating by thermocompression bonding, and curing; wherein the polyimide precursor solutions are produced by the same tetracarboxylic dianhydrides and diamines as the instantly claimed polyimide (A) and the same diamine with similar dianhydrides as the instantly claimed polyimide (B); wherein one layer reads upon the claimed high rigidity and low linear expansion layer and the other reads upon the claimed highly heat-resistant amorphous layer (Col. 2, line 8-Col. 5, line 67, Col.6, line 6-Col. 7, line 21, Col. 7, line 63-Col. 8, line 27; Examples.) Okamura et al also teach that additives can be included to accelerate the imidation reaction and further, it is possible to add a silane coupling agent, filler or other additives as needed (Col. 7, lines 50-62.) Okamura et al further teach that the insulating resin layer(s) as whole have a CTE of less than 30 and that the layers can have a thickness range and ratio as recited in Col. 7, line 63-Col. 8, line 22 (Col. 7, line 63-Col. 8, lines 23-28.)

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6. Claims 10, 11 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Shigeta et al for the reasons recited in the prior office action and restated below.

7. Shigeta et al teaches a substrate for a flexible print wiring board excellent in heat resistant, having a polyimide based resin layer wherein a solution of a polyimide based resin precursor is directly applied on an electrically conducting material to form a polyimide based resin precursor layer and then the precursor layer is cured by heating to prepare a polyimide based resin layer, characterized in that a solution of a polyimide based resin precursor B, which is one of solutions of two types of polyimide based resin precursors, is directly applied on an electrically conducting material and then, on the resultant layer is applied a solution of a polyimide based resin precursor A on the B layer followed by curing; wherein Shigeta et al further teach that a silane coupling agent may be added to the solutions for improvement of adhesion or adhesiveness (Abstract; Col. 9, lines 23-29; Col. 11, lines 15-18.) Shigeta et al also teach the same polyimide precursor solutions as instantly claimed including the same tetracarboxylic dianhydrides and diamines for claimed polyimide (A) and the same diamines and similar tetracarboxylic dianhydrides for claimed polyimide (B), wherein the resulting layers are applied to a desired thickness with a thickness ratio as taught in Col. 11, and the resulting polyimide-based resin layer as a whole as an average linear expansion coefficient of 10 to 40ppm, with either layer A or B having a higher or lower linear expansion coefficient than the other (Col. 3-Col. 10, lines 34; Examples.)

***Claim Rejections - 35 USC § 103***

8. Claims 1-3, 5-7, 9, 12-15, 17-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamura et al. The teachings of Okamura et al are discussed above. In terms

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of the claimed dianhydrides for the “polyimide (B)” as recited in Claim 1, Okamura et al teach that various aromatic tetracarboxylic acid dianhydrides may be utilized and specifically teach biphenyl tetracarboxylic dianhydride (BPDA), but only disclose 3,3',4,4'-BDPA or s-BDPA not the claimed a-BPDA or 2,3,3',4'-BDPA, or the claimed 2,2',3,3'-BDPA. However, the claimed BDPAs are obvious species of functionally equivalent dianhydrides, specifically BDPA dianhydrides, utilized in the art and would have been obvious to one having ordinary skill in the art at the time of the invention given the teachings of Okamura et al and the reasonable expectation of success. With respect to the claimed tensile modulus, the Examiner takes the position that one having ordinary skill in the art at the time of the invention would recognize that the flexible film taught by Okamura et al which is produced by the same polyimide resin layers as instantly claimed, would naturally have a tensile modulus within the claimed range given that the polyimide resin layers are formed by the same process using the same and/or similar polyamic acid precursor solutions. Lastly, with respect to Claim 6, though Okamura et al teach that a silane coupling agent can be further included in any of the polyimide precursor solutions, Okamura et al do not specifically teach that the silane coupling agent is an aminosilane or epoxysilane, however, as previously recited, aminosilanes as well as epoxysilanes are obvious species of conventional coupling agents utilized in the art and would have been obvious to one having ordinary skill in the art at the time of the invention. Additionally, it is noted that titanate coupling agents are functionally equivalent to silane coupling agents in the art and also would have been obvious to one skilled in the art at the time of the invention.

9. Claims 1-3, 5-7, 9, 12-15, 17-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shigeta et al. The teachings of Shigeta et al are discussed above. In terms of

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the claimed dianhydrides for the “polyimide (B)” as recited in Claim 1, Shigeta et al teach that various aromatic tetracarboxylic acid dianhydrides may be utilized and specifically teach biphenyl tetracarboxylic dianhydride (BPDA), but only disclose 3,3',4,4'-BDPA or s-BDPA not the claimed a-BPDA or 2,3,3',4'-BDPA, or the claimed 2,2',3,3'-BDPA. However, the claimed BDPAs are obvious species of functionally equivalent dianhydrides, specifically BDPA dianhydrides, utilized in the art and would have been obvious to one having ordinary skill in the art at the time of the invention given the teachings of Shigeta et al and the reasonable expectation of success. With respect to the claimed tensile modulus, the Examiner takes the position that one having ordinary skill in the art at the time of the invention would recognize that the flexible film taught by Shigeta et al which is produced by the same polyimide resin layers as instantly claimed, would naturally have a tensile modulus within the claimed range given that the polyimide resin layers are formed by the same process using the same and/or similar polyamic acid precursor solutions. Lastly, with respect to Claim 6, though Shigeta et al teach that a silane coupling agent can be further included in any of the polyimide precursor solutions, Shigeta et al do not specifically teach that the silane coupling agent is an aminosilane or epoxysilane, however, as previously recited, aminosilanes as well as epoxysilanes are obvious species of conventional coupling agents utilized in the art and would have been obvious to one having ordinary skill in the art at the time of the invention. Additionally, it is noted that titanate coupling agents are functionally equivalent to silane coupling agents in the art and also would have been obvious to one skilled in the art at the time of the invention

***Response to Arguments***

10. Applicant's arguments with respect to claims 1-3, 5-7, 9, 12-15, 17-19, and 21 have been considered but are moot in view of the new ground(s) of rejection. With respect to Claims 10, 11 and 22, the Examiner notes that these claims were not amended to limit the polyimide (B) to the two BDPAs as recited in amended Claim 1 and hence Applicant's arguments are moot with respect to these claims.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R. Jackson whose telephone number is 571-272-1508. The examiner can normally be reached on Mondays-Thursdays, 10:00AM-5:00PM.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Monique R Jackson/  
Primary Examiner, Art Unit 1794  
May 6, 2009